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sions throughout the work. To cite these instances in detail would require too much space, but they will not fail to arrest the attention of those familiar with the subject. It is no doubt to the same fundamental cause that the work owes its grave defects in classification, a defect that appears even in the title. Bitumen is the generic term that includes all forms of petroleum and asphalt. Moreover, no distinction is made between the peculiar use made by French authors of the word *asphalte* as applied to the asphaltic limestones and sandstones of eastern France and Switzerland and the use of the word to designate the solid form of bitumen, in which latter use he has made it the equivalent of 'asphalt' in English. The words naphtha and petroleum, and petroleum and maltha, are also used interchangeably to some extent in some places and with different meanings in others, so that throughout the work the use of these words is not clear. This confusion arises from a disregard of details that belong to chemistry rather than to geology.

As a whole, the work possesses great merits and grave defects; especially is the latter statement true in relation to American bitumen. The work should be read with careful discrimination, which is much to be regretted, as it will doubtless be widely read in Europe, where its merits will be much more apparent than its defects.

S. F. PECKHAM.

The Glacial Nightmare and the Flood. By SIR HENRY HOWARTH, K. C. I. E., M. P., F. G. S., etc. 2 vols. Pp. 11-920. Sampson, Low, Marston & Co.

This volume is a manual of the facts and changing opinions gathered and expressed by the students of the superficial features of Europe and America from the earliest days of observation, and brings into prominence the names of many excellent men formerly overlooked or forgotten. The work is a fair

history of the rise and decay of the theory of floods, of the universality and restriction of iceberg action, of the origin and culmination of the glacial theory. Thus far the author's views are only seen in the title. On the subject of the unity of the glacial period, the evidence is stated with the writer's judgment favoring one general period of cold. The astronomical theory of the cause of the Ice Age is shown to be unsustained by the evidence. The cause of glacial motion and the mechanical effects of the glaciers are discussed in a masterly manner, with conclusions very acceptable to most of us. The use of the doctrine of an ice cap and its subsequent restriction to continental areas is explained. But now the work is directed against extreme views, which have prevailed or are still dominant, on the ground of want of evidence. In the latter part of the work the writer ceases to be the judicial historian and becomes the philosopher, and explains some phenomena of the drift, carefully analyzed, by an appeal to 'waves of translation,' a modification of the doctrine of catastrophies in contra-distinction to the ideas of extreme uniformity which often need modification. The work is invaluable to the American student on account of giving him access to many of the fathers of superficial geology, whose works are not ordinarily accessible. These works also show how much more had been done by the early observers than is credited to them by most modern writers, partly on account of facts becoming public property in course of time, and partly on account of the impossibility of doing justice to so many men at all times. Yet these men were the intellectual ancestors in the field of surface geology. Another lesson is taught that conclusions of many of the most distinguished writers have not withstood deeper research, and have been replaced by the views of others who in turn will pass behind the curtains of time. Yet the science was originated and devel-

oped by these early geniuses, who should still be honored. As a manual the work should be in the hands of every student of superficial geology, and must form one of his most valuable works of reference. In a great manner the conclusion of the author will be most acceptable. On other points, differences of opinion will prevail here as in the works of all other philosophic writers. The title of the book is its sensational feature, and might awaken more opposition than its general judicial character would give rise to.

J. W. SPENCER.

The Etiology of Osseous Deformities of the Head, Face, Jaws and Teeth. By EUGENE S. TALBOT, M. D., D. D. S. Third Edition. Revised and enlarged, with 461 illustrations. Chicago, The W. T. Keener Company. Pp. 487.

Dr. Talbot's work is a most ambitious one, and this is perhaps its chief fault. It contains an enormous amount of facts and figures gathered from every source and touching upon every question from anthropology and crime to the useful art of taking care of the teeth. If the doctor could have condensed his book and given it a little more proportion and coherence it would appeal much more to the general and scientific reader. As it is, we find in it much original observation and a multitude of anatomical and anthropological facts which are interesting and should prove useful.

An excellent example of the author's work is shown in his chapter on developmental resources. Here he starts with the simple problem of the palatal arch in idiots and ends in a discussion of the general problem of osseous deformities as related to the different forms of degeneration. Dr. Talbot is manifestly a follower of Morel and Lombroso and adds many facts in support of the view that characteristic stigmata accompany the degenerative state. We must add again, however, that he fails to

take what we would consider a properly conservative view of the question, and, while he gives many valuable data regarding criminals, he does not, we think, consider sufficiently the anatomy of the normal man of the low social stratum from which most of his criminals come. Lombroso has himself abandoned anthropometrical measurements as affording much help in establishing a criminal type.

We must add, in conclusion, and in justice to Dr. Talbot, that we know of no American who has made so many personal observations and measurements on the defective classes, and he is entitled to great credit for his work. CHARLES L. DANA.

DOUBLE REFRACTION IN WOOD.

Doppelbrechung elektrischer Strahlen. K. MACK. Wied. Ann. 54, 1895, p. 342.

Bemerkung über die Abhandlung von Herrn Mack. W. VON BEZOLD. Ibid. 54, 1895, p. 752.

Doppelbrechung elektrischer Strahlen. A. RIGLI. Ibid. 55, 1895, p. 389.

Mr. Mack's article describes an interesting series of experiments to demonstrate that plates of wood exhibit a double refraction of electric waves. The sender and receiver were so arranged, with spark gap and reflectors, that the waves were 50-60 cm. in length. The test for double refraction in light is the lightening up of the field when the substance is introduced between crossed Nicols; similarly, Mr. Mack tested for double refraction of electric waves by introducing plates of wood between crossed sender and receiver. The first plates were of fir-tree 0.5-1.0 sq. M. area and 2.3 cm. thick, and gave negative results. An octagonal plate of fir about 60 cm. in diameter and 20 cm. thick was afterward used, and showed a decided double refraction when its fibres were 45° to the sender and receiver, and also between parallel sender and receiver showed